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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Sec. 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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**Gaming equipment for table games in which  
playing cards and gaming chips (jettons) are used,  
in particular for the game of "Black Jack"**

**Technical field**

The invention relates to gaming equipment for playing games of chance like "Black Jack" and other similar games in which playing cards and gaming chips (jettons) are used.

**Preceding technical level**

Gaming equipment for table games is known in which playing cards and gaming chips are used, in particular for the game of "Black Jack" (see USA patent No. 5735525 dated February 5, 1997, published April 7, 1998, Intern'l class A63F 1/18), including gaming table with cloth provided with betting boxes and other areas designated for placement of said gaming chips, as well as areas designated for placement of said playing cards face up, card shoe for storage and distribution of playing cards drawn from it face down, equipped with a playing card value imprint recognition and registration unit (the said cards are drawn from the card shoe).

The gaming table is equipped with bet registration detectors, installed in betting boxes and in the other areas designated for placement of said chips as well as playing cards detectors in the areas for their placement face up. The gaming equipment includes also an operation device connected with the playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe face down) with the bets registration detectors and playing cards detectors on the areas for placing them face up.

This known gaming equipment does not provide the possibility of an automatic control exercise in real time over keeping the gaming rules on each stage of it and

over the accuracy of dealer's payment of wins to players.

This results from the fact that the bet registration detectors and playing cards detectors reacting to the object's presence, placed on the gaming table, inform the operation device about the fact only, that the player has placed a bet and the playing card has entered the area before him. However neither the information about bet size nor the information about the playing card value imprint which came to the player, can be obtained from such gaming equipment. Thus, it is impossible to determine that the player has got just the playing card which was drawn from the card shoe. It is impossible to monitor in real time and to fix violation of rules in the form of bets changing; as well as it is impossible to control the accuracy of the dealer's payment of wins to players.

Gaming equipment for table games is also known in which playing cards and gaming chips are used, in particular for the game of "Black Jack" ( see USA patent No. 5605334 dated November 4, 1995, published February 25, 1997, Intern'l class A63F 1/18), including gaming table with cloth provided with betting boxes and other areas designated for said placement of said playing chips, as well as areas designated for placement of said cards face up, card shoe for storage and distribution of playing cards drawn from it face down, equipped with a playing cards value imprint recognition and registration unit (the said playing cards are drawn from the card shoe).

The gaming table is equipped with bets registration detectors, installed in the betting boxes and in the other areas designated for placement of said gaming chips as well as playing cards detectors in the areas designated for placement face up. The gaming equipment includes also an operation device connected with the playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe face down) with the bets registration detectors and playing cards detectors on the areas for placement face up. The operation device is provided with an information storage system.

The known gaming equipment does not provide the possibility of an automatic control exercise in real time over keeping the gaming rules on each phase of the game and over the accuracy of dealer's payment of wins to players.

This results from the fact that the detectors installed on the gaming table generate signals only of a bet's presence in the box suitable for it and about the placement of the playing card to the area suitable for its placement face up because the detectors react only to the object's presence in the area where detectors are installed. However it is not possible to obtain information about the bet's size and the playing card value imprint, which came to the area to be placed face up.

The operation device may control only the playing card's arrival from the card shoe to the gaming place where the bet was made, but it does not allow determination of the identity of the playing card value imprint which came to the player, with the playing card, drawn from the card shoe. When using this gaming equipment it is impossible also to control in real time the accuracy of the dealer's payment of wins to players and the absence of rules violation during changing of bets which are provided for such changing. As it is seen from the above, the sole reliable information which may be obtained and put into the operation device information storage system is the information about the playing cards value imprint (playing cards are drawn from the card shoe face down) - that is insufficient for automatic control over the game run in real time.

The most similar in technical point and obtained result for the claimed invention is gaming equipment for table games in which playing cards and gaming chips are used, in particular for the game of "Black Jack" (see German patent No. 4439502 dated November 8, 1994, published September 14, 1995, Intern'l class A63F 9/00, A63F 1/00), including gaming table with cloth provided with betting boxes and other areas designated for placement of said gaming chips, as well as areas designated for placement of said playing cards face up, card shoe for storage and distribution of playing cards drawn from it face down, equipped with optical electronic detector of

playing cards movement and with playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe), monitoring system of the game run, computer, connected with the separate functional units by wire or wireless communications, supplied with a system of electronic data processing programmed in accordance with the gaming rules, which allows evaluation of signals coming from the playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe face down) and from the monitoring system of the game run connected with the information storage system as well as the visualization device of data processed in the computer (the said data characterises the game run).

The monitoring system of the game run is created in the form of multiple single detectors placed on the gaming table under the cloth, the said detectors fix the objects on the table, the said detectors consist of a multitude of single detectors and gaming bet detectors acting as automatic recognition unit of the made bet registration. As the separate detectors composing the multitude of detectors fix the objects on the table, light-sensitive detectors are used, in particular photodiodes sensitive for infra-red rays, e.g. silicon diodes. The separate light-sensitive detectors are placed in the multitude of sensors in a way such that each object, gaming chip or playing card placed on the table cloth in accordance with the gaming rules, covers at least two detectors. The gaming bets detector intended for the automatic bet recognition, is a manual scanner which fixes the colour of the chip and the number of chips of the same color. The gaming bet detector may also comprise a high-frequency recognition system, including a transmitter-receiver station connected with transponders built into chips. Upon the supply of high-frequency signals to the transponder from the transmitter-receiver station, the said transponder sends reverse signals to the station, characterizing the evaluated chip value. The transponders include inductive antennas. The chips may have a device for information storage. The transmitter-receiver station has a high-frequency signal generator for the simultaneous

transmission of a power supply to the transponder, temporary and operating signals, demodulator, modulator, operational unit, system of uniform connections and signals, electronic reading/recording unit, several inductive antennas. The playing card value imprint recognition and registration unit (the said playing cards are drawn from the card shoe face down) is created in the form of an optical electronic detector placed in the way of movement of the playing card, the said detector registers the playing cards value imprint which are drawn from the card shoe, the said value imprint is situated in one and the same definite place. This optical electronic detector reacts to light of the definite area of the playing card, coloured or not coloured and causes switching on of a source of light impulses when the playing card value imprint passes the window of the card shoe. With the help of an optical deflecting device which is in the form of an optical prism or mirror, the image of the playing card value imprint is transmitted to a CCD image converter.

This known gaming equipment does not provide the possibility of an automatic control exercise in real time over keeping the gaming rules on each stage of it and over the accuracy of dealer's payment of wins to players.

It is explained by the fact that the multitude of light-sensitive detectors included in the monitoring system of the game run are intended only for fixing an objects' presence at the gaming table in the betting boxes and in other areas designated for placement of said chips, as well as on the areas designated for placement of said playing cards. However it is impossible to determine with the use of such detectors which precise playing card has entered the area where it's presence is fixed, and if it's value imprint is identical to the value imprint of the playing card drawn from the card shoe registered earlier. Similarly, it is impossible to determine the sizes of bets made by players with the help of the multitude of light-sensitive detectors. One can only fix the bet's presence in the designated areas of the gaming table. A manual scanner is used in the monitoring system of the game run of known gaming equipment for the count and chip value evaluation in bets made by each player; the said scanner

registers separately the chip or column of chips placed by each player, the image of the said chips is analyzed afterwards by count and colours, which determine the chips' value. In such a way the sizes of bets made by players are evaluated. Using such a manual scanner does not allow control of whether the bet made during the process of the whole game was changed in contradiction with the rules, e.g. an increase or decrease of the number, substitution of one or a few chips with other value chips. Chip scanning is executed once, and later during the whole game the control over the state of placed bets is absent due to the fact that it is impossible to carry it out technically. It is possible to provide the control in real time when using chips with transponders built into them and transmitter-receiver station for monitoring the players' bets, but, it is necessary to provide a signal constantly to each chip, to receive the informational signal from it's transponder, to interpret it for the chip's value, - and only afterwards the information may be transmitted for evaluation to the electronic data processing computer system. Manufacturing of chips with transponders requires high tangible expenses, and the transmitter-receiver station contains a big quantity of complicated and expensive apparatus. It is not at all possible to exercise control over the dealer's bank and over the accuracy of wins payment with the help of this known equipment. Thus, the persistent control over the game run during all it's phases and the control over keeping of the rules in real time are not exercised.

### **Description of the invention**

The basis of the invention is to aim to perfect gaming equipment for table games in which playing cards and gaming chips are used, in particular for the game of "Black Jack" by means of implementation of new components, new connections between the components and new implementation of the components; this will provide the possibility of an automatic control exercise in real time over keeping the gaming

rules on each phase of the game and over the accuracy of dealer's payment of wins to players.

The stated task is solved in the following way:

Gaming equipment for table games in which playing cards and gaming chips are used, in particular for the game of "Black Jack", including gaming table with cloth provided with betting boxes and other areas designated for placement of said playing chips, as well as areas designated for placement of said playing cards face up, card shoe for storage and distribution of the playing cards drawn from it face down, equipped with an optical electronic detector of playing cards' movement and with a playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe), a monitoring system of the game run, a computer, connected with the separate functional units by wire or wireless communications, supplied with a system of electronic data processing programmed in accordance with the gaming rules, which allows evaluation of signals coming from the playing cards value imprint recognition and registration unit (the said playing cards are drawn from the card shoe face down) and from the monitoring system of the game run connected with the information storage system as well as the visualization device of data processed in the computer and characterizing the game run;

the I n n o v a t i o n is represented in the monitoring system of the game run created in the form of an optical electronic device for the gaming table objects images processing , which contains playing cards value imprint recognition and a registration unit of the playing cards coming to each area for placing them face up, a players' bets recognition and registration unit, a dealer's bank recognition and registration unit and an operation unit of the monitoring system of the game run; as well as the gaming equipment is additionally provided with playing cards value imprint comparison unit , the first input of which is connected with the output of the playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe face down), it's second input is connected with the output of the playing cards value



imprint recognition and registration unit , (the said cards come to each area designated for placement of playing cards face up), and the output is connected with the computer; the input of the game run monitoring system operation unit is connected with the computer, the first output of the game run monitoring system operation unit is connected with the input of the playing cards value imprint recognition and registration unit , (the said cards come to each area for placement face up), and the second output is connected with the input of the dealer's bank recognition and registration unit and with the input of the players' bets recognition and registration unit; outputs of the dealer's bank recognition and registration unit and players' bets recognition and registration unit are connected with the computer, at the same time the optical electronic device of gaming table objects image processing is arranged over the gaming table.

The I n n o v a t i o n is also represented with the fact that the playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe face down) is created in the form of an optical electronic device containing

CCD image converter equipped with a object glass and processor, which are connected in sequence.

The innovation is represented with the fact that the gaming equipment contains two or more monitoring systems of the game run arranged over the gaming table at a distance between each other and each having a different inclination angle to the horizontal surface of the gaming table, the said monitoring systems are connected with the computer through an additional synchronization unit. The cause-and-effect relation between the aggregate of the essential features of the invention and obtained technical result is as follows.

The realization of the game run monitoring system in the form of an optical electronic device for gaming table objects images processing which contains playing cards value imprint recognition and registration unit (playing cards come to each area designated for placement face up, including the dealer's playing cards), players' bets recognition

and registration unit, dealer's bank recognition and registration unit and the game run monitoring system operation unit, providing the opportunity to exercise constant control over rules keeping at the gaming table. After recognition and registration of the playing cards value imprint (the playing card being drawn from the card shoe and passed to the area designated for playing card placement face up by one of the game players), the value imprint of the given card is immediately recognized and registered by the suitable unit included in the optical electronic device.

Due to the fact that the gaming equipment is additionally equipped with the playing card value imprint comparison unit, the first input of which is connected with the output of the playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe face down), its second input is connected with the output of the playing cards value imprint recognition and registration unit (the said cards come to each area designated for placement face up), and the output is connected with the computer; the input of the game run monitoring system operation unit is connected with computer equipped with a data processing electronic system programmed in accordance with the gaming rules, - the immediate comparison of the playing cards value imprint drawn from the card shoe with the playing card arrived on the gaming table. In case of their identity the game run monitoring system operation unit connected with the computer input having received the information about the comparison results, does not prevent further game continuation. In case the value imprint of playing cards, which are drawn from the card shoe, and the value imprint of paying cards, which come to the gaming table are different, then information about game rules violation appears on the screen of the visualization device of data processed in the computer, and the operation unit of the monitoring system of the game run gives a signal prohibiting further game continuation and immediately informs inspectorial staff about the gaming rules violation immediately. The players' bets recognition and registration unit and the dealer's bank recognition and registration unit during the process of the playing cards distribution provide

continuous automatic control to ensure that no changes conflicting with the gaming rules occur in players' bets and in dealer's bank.

Constantly incoming information from these units into the electronic data processing computer system about the fact that the chips count and their value both in players' bets and in dealer's bank remain unchanged confirms that the game runs without rules violation. In case of increase or decrease of the chip's count in players bets in a way not provided by the gaming rules, in case of value changing of these chips, as well as in the event of any changes arising in the dealer's bank, these units notify the system of electronic data processing of the computer about the beginning of non standart situation and this information appears on the processed data visualization device; and the game run monitoring system operation unit having received a signal of the rules violation , prohibits further game continuation. If the game runs without rules violation and the dealer has played the game with one of the players, then the operation unit disconnects the playing card value imprint recognition and registration unit on the gaming table. At this stage dealer's bank recognition and registration unit informs the system of electronic data processing of the computer about dealer's bank increase or decrease by the sum equivalent to the size of dealer's win or loss respectively. The player's bet recognition and registration unit informs that the bet in the amount registered during the whole game has come to the dealer's bank in case of player's loss, or about the fact that the player was paid the respective win in case of the dealer's loss. The results of this phase are reflected on visualization device of processed data, and, in the case of absence of the violations in the game, the game run monitoring system operation unit having received the said signal, does not prohibit the work of the value imprint recognition and registration unit of the playing cards coming to the following area designated for placement of the playing cards face up, and also the player's bets recognition and registration unit for the control over non changing of the bet's sum and the dealer's bank recognition and registration unit for the control of the fact that no changes occur in it. If the information about gaming

rules violation by player or dealer appears on visualization device of processed data, the inspectorial staff is informed immediately about this fact, and the said staff take a decision regarding the possibility of the further continuation of the game. Also in such a way the game continues up to its end under the constant control in real time.

The provision of the possibility of automatic checking and monitoring of the rules keeping is reached also due to the fact that the playing cards value imprint recognition and registration unit (playing cards are drawn from the card shoe face down) is created in the form of an optical electronic device containing object-glass, CCD image converter and processor, which are connected in sequence.

Under such realization of the given unit the playing card value imprint recognition and registration is provided constantly from the moment when the optical electronic sensor switches on the unit upon the front edge of the playing card appearing from the card shoe, up to the moment of the back edge of the playing card leaving the unit.

At the same time not only the recognition of the playing card value imprint arranged in the predetermined place is carried out but also the whole playing card is recognized and registered during the process of movement through the card shoe. During the process of the playing card movement the object-glass constantly forms the information on the CCD-image converter about each area passed. Then the information comes to the processor, which registers areas of the playing card as far as it moves in the card shoe and its whole image before its withdrawal from the card shoe. Thus, the possibility of gaming rules violation during the playing card withdrawal from the card shoe is fully impossible, and the reliable information comes to the comparison unit about what playing card is withdrawn from the card shoe and should come to the area designated for placement face up.

The possibility of the automatic control over keeping the gaming rules is achieved due to the fact that the gaming equipment contains two or more game run monitoring systems arranged over the gaming table at a distance between each other and having different inclination angles to the horizontal surface of the gaming table, the said

monitoring systems are connected with the computer through the additional synchronization unit. During the game process in accordance with the rules accepted in the casino the player may double the bet made earlier or divide the deck in case of getting two equal value cards and make a bet of the same size respectively (or doubled) to the second deck. Two players may play together at one gaming place at the gaming table, one of them or both at once may double bets or divide the deck having made the additional bet to the second deck. All these actions are connected with the fact that in the area of object-glass' scan of one game run monitoring system players' hands e.g., appear periodically, which hinder the constant monitoring of the gaming table and changes taking place on it. Under the arrangement of two or more game run monitoring systems above the gaming table at a distance between each other and having different inclination angles to the horizontal surface of the gaming table, in every point of time the synchronization unit, through which the game run monitoring systems are connected with the computer, switches on the monitoring system or systems which receive the complete information from the gaming table about the playing cards coming to designated areas, about players' bets and the dealer's bank state. Due to this fact the automatic control over keeping the gaming rules and over the accuracy of the dealer's payment of wins to the players is provided in any situation. The control over the game run is exercised in real time.

### ***Brief description of drawings***

The nature of the invention is explained with drawings, in fig. 1 the gaming table with the game run monitoring system arranged over it is shown in general form; in fig. 2 – the card shoe, side view; in fig. 3 – a block diagram of the gaming equipment with one game run monitoring system; in fig. 4 – the same, with three game run monitoring systems.

Gaming equipment for table games in which playing cards and gaming chips are used, in particular for the game of "Black Jack" contains a gaming table 1 with a cloth 2,

marked with sectors 3 for bets and other areas 4 for possible chips placing , as well as areas 5 for placement of playing cards face up. On the gaming table 1 a card shoe 6 is arranged for storage and distribution of playing cards withdrawn from it face down. The card shoe 6 with a distributing slot 7 is equipped with an optical electronic detector 8 of the playing cards movement and with a playing cards value imprint recognition and registration unit 9, (playing cards are drawn from the card shoe face down), which is in the form of an optical electronic device 10, containing an object-glass 11, CCD-image converter 12 and processor 13, connected in sequence.

Over the gaming table 1 a game run monitoring system 14 is arranged which is in the form of an optical electronic device of the playing table 1 object image processing, containing playing cards value imprint recognition and registration unit 15, the said playing cards coming to each area designated for placement face up, players' bets recognition and registration unit 16, dealer's bank recognition and registration unit 17 and operation unit 18 of the game run monitoring system 14. The gaming equipment also contains a playing cards value imprint comparison unit 19, a computer 20 equipped with a system 21 of electronic data processing programmed in accordance with the gaming rules, which allows evaluation of signals coming to the computer 20, connected with a system 22 of information storage, and a processed data visualization device 23 characterizing the game run.

The first input of the playing cards value imprint comparison unit 19 is connected with the output of playing cards value imprint recognition and registration unit 9 (playing cards are drawn from the card shoe 6 face down), and its second input is connected with the output of the playing cards value imprint recognition and registration unit 15 , the said cards come to each area 5 designated for placement face up, and the output is connected with the computer 20. The input of the game run monitoring system 14 operation unit 18 is connected with the computer 20, the first output of the game run monitoring system 14 operation unit 18 is connected with the input of the playing cards value imprint recognition and registration unit 15 (the said

cards come to each area 5 designated for placement face up), and the second output is connected with the input of the dealer's bank recognition and registration unit 17 and with the input of the players' bets recognition and registration unit 16. Outputs of the dealer's bank recognition and registration unit 17 and players' bets recognition and registration unit 16 are connected with the computer 20. The gaming equipment contains two or more game run monitoring systems 14 arranged over the gaming table 1 at a distance between each other and having different inclination angles to the horizontal surface of the gaming table 1, the said monitoring systems are connected with the computer 20 through an additional synchronization unit 24. On the output from the card shoe 6 above the playing cards recognition and registration unit 9 of the playing cards drawn from the card shoe 6 face down a mechanical limiter 25 of the possible displacement of the playing card may be arranged, which provides the necessary position for reading the playing card face down during the period of playing card withdrawal and reading the information about its value imprint. The mechanical limiter 25 of possible movements just allows the playing card to extend over the playing cards recognition and registration unit 9 (playing cards are drawn from the card shoe 6 face down), and does not allow it to turn over until the information about the playing card value imprint is read.

### **The best variant of invention implementation**

Gaming equipment for table games in which playing cards and gaming chips are used, in particular for the game of "Black Jack" operates in the following way:

Before the beginning of the game the dealer carefully shuffles the playing cards, it is advisable to use a device for this purpose, then he places them face down in the card shoe 6 in the direction of the distributing slot 7 in it. Each player at the gaming table 1 makes his bet by placing chips in the betting boxes 3 for bets marked on the cloth 2, arranged opposite his gaming place. If the bet consists of a few chips, they are placed in a column. The dealer's bank is located on the gaming table 1 in the special

opened boxes arranged near his gaming place on the area 4, in which the chips are placed on ribs. The players' bets recognition and registration unit 16 and dealer's bank recognition and registration unit 17 of the game run monitoring system 14, arranged over the gaming table 1, transmit information about the size of the bets made in each gaming area, and about the dealer's bank size to the computer 20, from which the information comes to the electronic data processing system 21. Then the dealer distributes the playing cards from right to left to all players, one card per player and takes one for himself. At the same time as a playing card edge crosses the border of the operation zone of the optical electronic detector 8 of the playing cards movement, the said detector switches on the playing cards value imprint recognition and registration unit 9 (playing cards are drawn from the card shoe 6 face down), created in the form of an optical electronic device 10. The object-glass 11 of the optical electronic device 10 during playing card movement through the mechanical limiter 25 of possible displacement constantly provides information to the CCD image converters 12 about each part passing and then about the whole playing card, from the said converter the said information comes for further processing to the processor 13, where the processing of images of each part of the playing card passing before the object-glass takes place, and the said images comparison with the whole playing card image before it's withdrawal from the distributing slot 7 of the card shoe 6. If the images are identical, then the unit 9 transmits the information to the playing card value imprint comparison unit 19. If the images are different, then the unit 19 gives a signal about gaming rules violation. The playing cards value imprint recognition and registration unit 15 (the said cards come to each area designated for placement face up) transmits the information about the image of the playing card which came to the area 5 of the gaming table 1 designated for placement of the playing card face up (the said card is assigned to a particular player) to the playing card value imprint comparison unit 19. After comparison of images, which came from units 9 and 15, playing card value imprint comparison unit 19 transmits the information about their



identity or difference to the computer 20, from which it comes to the system of electronic data processing 21, which processes this information in accordance with the gaming rules and then transmits it to the visualization device 23 of data processed in computer 20. If the gaming rules are kept, the playing cards distribution is fulfilled in the same way in turn to each player and dealer. Next, the second playing cards are distributed, starting from the first player from the right, moreover the dealer's second playing card is placed face down. Having received the second playing cards, each player may double the bet, take the additional playing cards or in case of receiving of two e.g. tens divide the deck into two decks, having made the same bet to the second deck, and also may double the first bet. Each player is able to make an insurance bet placing it at the area 4 of the gaming table 1. The insurance bet equals the half of the initial bet and the player makes it in order to insure his initial bet against the dealer's win if the dealer has received the first card with a higher value, e.g. ten. In case of dealer's win that is if he has "Black Jack" – 21 exactly, the player wins the doubled insurance bet. If the dealer does not receive 21 exactly, the player loses the insurance bet but plays the usual game on his initial bet. Two players may play at one gaming place; one player or two of them may carry out at once all the said actions with the playing cards and bets. The dealer plays with each player by turn, at the same time the game with the next player may be carried out only after the fact when the dealer has taken the bet after the game with the previous player and has filled the bank in case of the player's loss or has paid the win from his bank in case of dealer's loss.

In the process of playing cards distribution unit 9 carries out the constant recognition and registration of the playing cards value imprints (playing cards are drawn from the cards shoe 6 face down), and unit 15 carries out recognition and registration of the playing cards coming to each area 5 designated for placing the said cards face up. The information from units 9 and 15 comes to the playing cards value imprint comparison unit 19, from which the information about the results of comparison comes to the

computer 20. The system of the electronic data processing 21 evaluates the signals received by the computer 20 and represents the results of processing on the visualization device 23. When information about rules violation during the playing cards distribution appears on the visualization device 23, the inspectorial staff is informed immediately, and the said staff takes a decision regarding the continuation or stop of the game. Players' bets recognition and registration unit 16 and dealer's bank recognition and registration unit 17 together with units 9, 15 and 19 collect and transmit the information about the situation on the gaming table to the computer 20. Data about any changes in players' bets or in dealer's bank taking place within the playing cards distribution come to the system of electronic data processing 21 and are evaluated by it with relation to keeping the gaming rules. In case of any violation information about this fact appears on the visualization device 23 and the inspectorial staff is informed. After the end of playing cards distribution the operation unit 18 of the monitoring system 14 of the game run disconnects the unit 15 and finishes in operation only units 16 and 17, recognize and register the information about changes in the players' bets and in the dealer's bank during mutual calculations after the end of the game with each player. This information comes to the system of electronic data processing 21 of the computer 20, which processes it taking into account the information received earlier about the playing cards value imprint of the dealer and of each player and evaluates whether the mutual calculations correspond to the gaming rules. The data received as the result of processing are displayed on the visualization device 23, and in case information about a gaming rules violation comes, the inspectorial staff is informed for taking measures of solving the current situation. The system 14 continues to monitor the game run until the end of mutual calculations between the dealer and the last player. All the information received by the system of electronic data processing 21 from the players' bet recognition and registration unit 16 and dealer's bank recognition and registration unit 17 included in monitoring system of the game run as well as from the players' cards value imprint comparison unit 19,

comes to the information storage system 22. Also data from the system 21 is transmitted here after the electronic processing. If necessary it is possible to get all data about each phase of the game or about the whole game from the information storage system 22.

The gaming equipment being claimed may contain two or more game run monitoring systems 14, arranged at a distance between each other and having different inclination angles to the horizontal surface of the gaming table 1, and connected with the computer 20 through the additional synchronization unit 24. Players' hands may be a hindrance for the constant control over the game run with the help of one system 14 during division of deck by the player, when players make insurance bets, double the initial bets, as well as make the bet to the second deck during the deck division. By using several monitoring systems 14 of the game run the synchronization unit 24 chooses which monitoring system or systems of the game run provide the constant monitoring of the current situation at the gaming table 1.

As is evident from the above, the gaming equipment claimed provides automatic control over keeping the gaming rules in real time on each phase of it and over the accuracy of dealer's payment of wins to players. Such monitoring of the whole game run with the use of high speed data processing of the game run allows to receive the information about the dealer's work quality, about methods of the gaming run by each player. Due to this a high level of technical control is provided, rules violation is prevented and the casino safety is increased.

### **Industrial application**

In the gaming equipment being claimed for table games in which playing cards and gaming chips are used, in particular for the game of "Black Jack", gaming table 1 with cloth 2 provided with betting boxes 3 and other areas 4 designated for placement of said gaming chips, as well as areas 5 designated for placement of said playing cards face up, and the card shoe 6 with the distributing slot 7 and optical electronic sensor 8

of playing cards movement are created in the same way as in the gaming equipment known from the prototype or with the use of any other standard gaming tables and card shoes known in this technical field. An optical electronic device 10, containing object-glass 11, CCD-image converters 12 and processor 13, and the game run monitoring system 14, may be represented by optical electronic devices formed e.g. on the basis of intelligent video camera IVC-1, containing the optical device, video sensor, processor of digital processing of images, operative storage cell, reprogrammed storage cell for programs and setting parameters storage in case of power cut, digital inputs/outputs for connection with the ancillary apparatus, transmitter-receiver for connecting the standard channel RS-232 (see V. Bojun, Y. Sabelnikov. Intelligent video camera. Scientific and technical magazine "Electronic components and systems" Kiev, SPF VD MAIS, No. 2, 2002, p. 33-35). The intelligent video camera video sensor HDCS-2020 produced by the firm Agilent Technologies is used, which provides the possibility of recognition parameters changing, also the processor for digital processing of signals ADSP-2183 manufactured by the firm Analog Devices is used. The intelligent video camera ensures video images processing in real time and allows to realize the recognition of the whole review sector as well as of the separate areas with fixed and automatic exposure and video signal intensification coefficient setting. It is used as independent objects' identifier, dynamic objects registrar, high speed detector of movement, the system of panning, and video sequence montage. Processor ADSP-2183, being the central controlling and processing device, has a high speed of operation and a large volume of "prompt" internal memory of programs and data for solving the task of control over the game run provision in real time.

Optical electronic device 10 and monitoring system 14 of the game run may be created also on the base of intelligent video camera VS 710 (see Intelligent video camera VS 710. Scientific and technical magazine "Electronic components and systems" Kiev, SPF VD MAIS, No. 1, 2001, p. 46), containing optical sensor,

processor, computing device, periphery devices and power unit. As the sensing element CCD – sensor with a high-resolution ratio is used in the intelligent video camera VS 710. The period of shot change may be set from 1/50 up to 1/10000 of second. The operation in the mode of half picture or full picture with the programmable image ratio is possible. Intelligent video camera VS 710 allows obtaining of undistorted images even of fast moving objects.

On realization of the monitoring system 14 of the game run on the basis of intelligent video cameras IVC-1 or VS 710, high reliability and operation speed of playing cards value imprint recognition and registration unit 15 (playing cards come to each designated area for placement face up), of players' bets recognition and registration unit 16, of dealer's bank recognition and registration unit 17 are provided.

Operation unit 18 of the monitoring system 14 of the game run may be created on the basis of standard monoboard computers, e.g. SBC BL 2000 containing up to 28 inputs/outputs.

The computer 20 providing cooperation of all functional units may be created in the form of monoboard computer ROBO-603 having two USB-ports. One of the USB ports is used for units connections, which provide control over the game run, and the second USB-port provides connection to the system 21 of electronic data processing. By this port the changing of the software determining the gaming rules is carried out. Data about the computer is provided in the scientific and technical magazine "Electronic components and systems", Kiev, SPF VD MAIS, No. 9, 2002, p. 26.

The system of electronic data processing 21, to which the information about the game run received to computer 20 is transmitted, may be created on the base of monoboard computer NC-6060 (see monoboard computer NC-6060 of the company Portwell. The scientific and technical magazine "Electronic components and systems", Kiev, SPF VD MAIS, No. 9, 2002, p. 36), having extensive functional abilities.

The information storage system 22 and visualization devise 23 of data processed in computer may be created in the same way as in gaming equipment known from the

Nature of the invention: gaming equipment for table games in which playing cards and gaming chips are used, in particular for the game of "Black Jack", including gaming table with cloth provided with betting boxes and other areas designated for placement of said gaming chips , as well as areas designated for placement of said playing cards the face up, card shoe for storage and distribution of playing cards drawn from it face down, equipped with the optical electronic detector of playing cards movement and with the playing cards value imprint recognition and registration unit (the said playing cards are drawn from the cards shoe), monitoring system of the game run, computer, connected with the separate functional units by elements of wire or wireless communications, supplied with system of the electronic data processing programmed in accordance with the gaming rules, which allows to evaluate signals coming from the playing card value imprint recognition and registration unit (the said playing cards are drawn from the card shoe face down), and from the monitoring system of the game run connected with the information storage system, as well as with the visualization device of data processed in computer, characterizing the game run.

The innovation is represented in the fact that monitoring system of the game run is created in the form of optical electronic devise for the playing table objects images processing, which contains playing card value imprint recognition and registration unit (the said playing cards coming to each area designated for placement of said playing cards face up), players' bets recognition and registration unit, dealer's bank recognition and registration unit and the game run monitoring system operation unit, as well as the gaming equipment is additionally provided with playing cards value imprint comparison unit , the first input of which is connected with output of the playing cards value imprint recognition and registration unit (the said playing cards are drawn from the card shoe face down), it's second input is connected with output of the playing cards value imprint recognition and registration unit (the said cards come to each area designated for placement the said playing cards face up), and the output

is connected with computer; the input of the game run monitoring system operation unit is connected with computer, the first output of the game run monitoring system operation unit is connected with the input of the playing cards value imprint recognition and registration unit (the said cards come to each area designated for placement the playing cards face up), and the second output is connected with the input of the dealer's bank recognition and registration unit and with the input of the players' bets recognition and registration unit; outputs of the dealer's bank recognition and registration unit and players' bets recognition and registration unit are connected with computer; at the same time the optical electronic device of gaming table objects images processing is arranged over the gaming table. The I n n o v a t i o n is represented with the fact playing cards value imprint recognition and registration unit (the said cards are drawn from the card shoe face down) is created in the form of optical electronic device, containing object-glass, CCD-image converters and processor connected in sequence. The I n n o v a t i o n is also represented with the fact that gaming equipment has two or more game run monitoring systems arranged over the gaming table at the distance between each other and having different inclination angle to the horizontal surface of the gaming table, the said monitoring systems are connected with computer through the additional synchronization unit. Technical result: provision of the possibility of the automatic control exercise in real time over keeping the gaming rules at all phases of the game and over the accuracy of dealer's payment of wins to players.